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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,958	03/03/2004	Qinbai Fan	GTI-1556	5068

33058 7590 11/14/2006

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EXAMINER

FICK, ANTHONY D

ART UNIT	PAPER NUMBER
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1753

DATE MAILED: 11/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/791,958	Applicant(s) FAN ET AL.	
	Examiner Anthony Fick	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 March 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 March 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>3/3/04 6/1/04</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: reference number 57 in figure 6. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Sheets" and must be presented in the amendment or remarks section that explains the change(s) to the drawings. See 37 CFR 1.121(d)(1). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

Specification

Art Unit: 1753

3. The disclosure is objected to because of the following informalities: paragraph 0030 contains several incorrect numerical references in regard to figure 6 in lines 7 and 9. Specifically, line 7 contains the number 54 defined for both the photoanode and the photocathode and line 9 contains the number 58 defined for the light transmissive wall where 58 is used prior for the electrode separator and 52 for the light transmissive wall.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claims 1 through 28 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The subject matter that was not described in the specification is a water permeable photovoltaic device. The examiner has considered several factors to make the determination that one of ordinary skill in the art would not be able to recreate the applicant's claimed inventions without undue experimentation. The breadth of the claims is narrow in terms of requiring a water permeable photovoltaic device, but broad in that the claims are not limited to a specific photovoltaic material. Applicant's invention is a type of device that is within prior art and the state of the prior art is advanced in terms of photovoltaic photoelectrochemical devices. Some examples of

Art Unit: 1753

prior art include Deng et al. (U.S.P.G.Pub 2005/0211290), Mauk (U.S.P.G.Pub 2004/0003837) and Graetzel et al. (U.S. 6,936,143). The level of ordinary skill in the art is high along with a high level of predictability within the art. However, the amount of direction given by the inventor to create the water permeable photovoltaic devices is very little. Applicant's state within the specification the photoelectrodes are water permeable and are comprised of water permeable components, but do not give specific examples of such water permeable components. Further the specification does not provide any working examples to give any direction in creating the water permeable photovoltaic devices. The prior art in the area of photovoltaic devices repeatedly describes methods and apparatuses that protect photovoltaic devices from contact with water. The photovoltaic cells that are used in photoelectrodes are covered with specific layers to protect the cells from contact with the water, see Mauk, Deng et al. and Graetzel et al. Therefore, the prior art teaches away from contact with water for photovoltaic devices and hence it is not well known how to create a water permeable photovoltaic device. The amount of experimentation required to recreate the claimed devices on the basis of the disclosure is extremely high as one of ordinary skill would be required to find the appropriate material and then make the material water permeable and still work as a photovoltaic device. There is no direction within the disclosure or the prior art to assist in making the present invention. Thus for the reasoning above, it is the position of the examiner that the water permeable photovoltaic devices within the present claims are not enabled.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

Art Unit: 1753

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 12, 14, 15, 17, 18 and 22 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 12 recites the limitations "second said water permeable photoelectrode", "second said light sensitive catalytic material layer" and "second said light transmissive wall". It is unclear if these limitations correspond to the original photoelectrode, material layer or wall or brand new ones. It is suggested that applicant remove the word "said" from each of the phrases to clarify the second photoelectrode of the claim from the one of claim 11.

9. Claim 14 recites the limitation "said light sensitive catalyst material layer" in line 1. There is insufficient antecedent basis for this limitation in the claim. Applicant can overcome the rejection by amending the claim to read "said first light sensitive catalytic material layer" to correspond with claim 11.

10. Claim 15 recites the limitation "said light sensitive catalyst material layer" in line 1. There is insufficient antecedent basis for this limitation in the claim. Applicant can overcome the rejection by amending the claim to read "said first light sensitive catalytic material layer" to correspond with claim 11.

11. Claim 17 recites the limitation "said polymer electrolyte membrane layer" in line 1. There is insufficient antecedent basis for this limitation in the claim. Applicant can overcome the rejection by amending the claim to read "said first polymer electrolyte membrane layer" to correspond with claim 11.

Art Unit: 1753

12. Claim 18 recites the limitation "said polymer electrolyte membrane layer" in line 1. There is insufficient antecedent basis for this limitation in the claim. Applicant can overcome the rejection by amending the claim to read "said first polymer electrolyte membrane layer" to correspond with claim 11.

13. Claim 22 recites the limitation "said first and second light sensitive catalytic material layers" in line 1. There is insufficient antecedent basis for this limitation in the claim. Applicant can overcome the rejection by amending the claim to depend from claim 12 or eliminating the reference to a second light sensitive catalytic material layer.

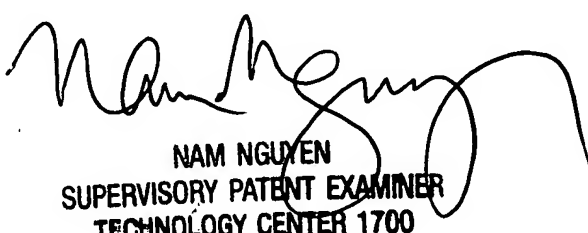
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Fick whose telephone number is (571) 272-6393. The examiner can normally be reached on Monday thru Friday 7 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1753

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Anthony Fick *ADF*
AU 1753
November 9, 2006



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